

DESCRIPTIONS OF NEW SPECIES OF TURBONILLA OF THE WESTERN
ATLANTIC FAUNA, WITH NOTES ON THOSE
PREVIOUSLY KNOWN.

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The present article is based on a small, but very interesting, collection of gastropods belonging to the genus *Turbonilla*, which, through the courtesy of Mr. Pilsbry, was recently loaned to the writer for study.

With few exceptions the specimens had been labelled as known southern species and in a few instances had been figured in Tryon's *Manual*, but a careful comparison with the original descriptions and figures showed that these names were incorrectly applied. Most of the species are now described and figured as new. That so many personal names have been adopted for them is, to a great extent, due to the almost overwhelming confusion existing in the names of the hundreds of already described living species (still more increased among fossil forms), by their duplication and, in some instances, reduplication, especially due to the lax usage of some authors in respect to the two genera, *Turbonilla* and *Odostomia*.¹

During the past few months the writer, jointly with Prof. A. E. Verrill, has arranged and studied the many hundreds of specimens belonging to these genera, dredged by the U. S. Fish Commission from 1871-1887, and also those in the Yale University Museum. The larger part of them represent unknown forms, fine figures of which have been prepared, and, as soon as practicable, will be published with their descriptions.

The acknowledgments of the writer are here expressed to Mr. Pilsbry for the privilege of publishing the following descriptions, and especially to Prof. Verrill, to whose generosity the drawings for the accompanying plates are wholly due.

List of Localities with the Species found at each.

Coast of North and South Carolina. William Stimpson; R. Swift.

No. 72,042. *Turbonilla Stimpsoni*, new species—not *T. interrupta* (Totten). 1 specimen
South Carolina. William Stimpson; R. Swift.

¹ Tryon's *Manual*, viii.

No. 72,043. *Turbonilla textilis* Kurtz (?) variety *a*—not typical. 2 specimens.

Bermuda. A. Heilprin.

No. 70,021. *Turbonilla Penistoni*, new species—not *T. pulchella* d'Orb. 1 specimen.

No. 79,009. *Turbonilla Heilprini*, new species—not *T. pulchella* d'Orb. 1 specimen.

Off Micco, Indian river, Fla., two fathoms, mud. F. C. Baker.

No. 60,125. *Turbonilla elegans* Verrill (?), variety (?)—not *T. interrupta* (Totten). 1 specimen.

No. 79,006. *Turbonilla* sp. (?)—not *T. interrupta* (Totten). 1 young specimen.

No. 79,007. *Turbonilla* sp. (?)—not *T. interrupta* (Totten). 1 young specimen.

No. 60,344. *Truncatella* sp. (?)—not *T. interrupta* (Totten). 3 specimens.

Sarasota Bay, Fla. H. Hemphill.

No. 72,049. *Turbonilla Dalli*, new species. 3 specimens.

No. 79,013. *Turbonilla Hemphilli*, new species. 3 specimens.

Marco, Fla., two fathoms. H. Hemphill.

No. 72,051. *Turbonilla textilis* Kurtz (?). 2 specimens.

Tampa Bay, Fla. Conrad; J. S. Phillips.

No. 72,052. *Turbonilla Conradi*, new species. 1 specimen.

No. 79,024. Too poor for identification. 1 specimen.

West Florida. C. W. Johnson (?), 1891.

No. 62,800. *Turbonilla incisa*, new species. 3 specimens.

No. 79,023. *Turbonilla incisa* var. *constricta*, new. 2 specimens.

St. Thomas, W. I. R. Swift.

No. 72,055. *Turbonilla Swiftii*, new species—not *T. pulchella* d'Orb. 9 specimens.

No. 72,044. *Turbonilla inclinata*, new species—not *T. pusilla* C. B. Adams. 1 specimen.

No. 79,010. *Turbonilla unilirata*, new species—not *T. pusilla* C. B. Adams. 4 specimens.

No. 79,011. *Turbonilla Penistoni* Bush, (?) variety (?)—not *T. pusilla* C. B. Adams. 1 young specimen.

No. 79,012. *Turbonilla abrupta*, new species—not *T. pusilla* C. B. Adams. 1 specimen.

No. 72,045. *Turbonilla Pilsbryi*, new species—not *T. Ritsei* Mörch. 1 specimen.

No. 72,050. *Turbonilla pyrrha*, new species—not *T. subulata* C. B. Adams. 3 specimens.

No. 79,017. *Turbonilla pyrrha*, variety *a*—not *T. subulata* C. B. Adams. 2 specimens.

No. 79,018. *Turbonilla pyrrha*, variety *c*—not *T. subulata* C. B. Adams. 3 specimens.

No. 79,019. *Turbonilla pyrrha*, variety *d*—not *T. subulata* C. B. Adams. 3 specimens.

No. 72,053. *Turbonilla pyrrha*, variety *b*—not *T. puncta* C. B. Adams. 3 specimens.

No. 72,047. *Cingula* (?) or *Fenella* (?)—not *T. dubia* d'Orb.

No. 79,025. *Cingula* (?) or *Fenella* (?)—not *T. dubia* d'Orb.

No. 79,026. *Cingula* (?) or *Fenella* (?)—not *T. dubia* d'Orb.

No. 79,027. *Cingula* (?) or *Fenella* (?)—not *T. dubia* d'Orb.

No. 79,028. *Cingula* (?) or *Fenella* (?)—not *T. dubia* d'Orb.

No locality given. R. Swift.

No. 72,046. *Turbonilla substriata* C. B. Adams. 2 specimens.

No. 79,016. *Turbonilla puncta* C. B. Adams—not *T. substriata* C. B. Adams. 5 fragments.

No. 79,020. *Turbonilla pyrrha*, new species—not *T. turris* d'Orb. 2 specimens.

No. 79,021. *Turbonilla pyrrha*, variety *a*—not *T. turris* d'Orb. 1 specimen.

No. 72,054. *Turbonilla pyrrha*, variety *b*—not *T. turris* d'Orb. 1 specimen.

No. 79,022. *Turbonilla pyrrha*, variety *c*—not *T. turris* d'Orb. 1 specimen.

No. 72,048. *Turbonilla pupoides* d'Orb.—not *T. flavocincta* C. B. Adams. 2 specimens.

No. 79,014. *Turbonilla pupoides*, variety *ischna*, new—not *T. flavocincta* C. B. Adams. 4 specimens.

No. 79,015. *Turbonilla compsa*, new species—not *T. flavocincta* C. B. Adams. 1 specimen.

No. 72,056. *Turbonilla pupoides* d'Orb. 1 specimen.

Maldonado Bay, Uruguay, three to six fathoms. Dr. William R. Rush, 1897.

No. 70,537. *Turbonilla atypha*, new species. 2 specimens.

No. 70,535. *Turbonilla Rushii*, new species—not *T. interrupta* (Totten). 1 specimen.

TURBONILLA.

Risso, 1826 (*sensu extenso*).

The genus *Turbonilla* is here taken in its most extended sense to include all species having a more or less elongated form, consisting of few or many planulate or more or less convex, sometimes shouldered, whorls, always ornamented with more or less prominent, transverse ribs, and always having a reversed, flattened or projecting nucleus consisting of about $1\frac{1}{2}$ to 3 whorls, tilted from transverse to the axis to more or less oblique. Intercostal spaces smooth or crossed by more or less distinct, incised, sometimes raised, spiral lines which often also appear on the base, which varies from short, little rounded (the body-whorl subangulated at the periphery), to elongate and well-rounded. Aperture varying from subquadrate with straight pillar-lip, to elongate-ovate, well-rounded and produced below, with curved pillar-lip. Peritreme generally discontinuous, rarely continuous; inner-lip more or less thickened and reflected, usually with a plication or fold, often invisible externally; outer-lip almost always thin, seldom thickened.

In its most restricted sense the genus was proposed by Risso, 1826, from Leach's manuscript, for *Turbo lacteus* Liuné, as the type, of which *Helix elegantissima* Montagu is now considered a synonym. This species has an elongated form; an obliquely tilted nucleus of about $1\frac{1}{2}$ flattened whorls; well developed transverse ribs ending at the periphery of the body-whorl, with smooth, intercostal spaces; base smooth; aperture somewhat elongated; pillar-lip straight, thickened and reflected.

Many species have, however, come to light which not only possess these characters in a more or less marked degree, but have others in addition. This has rendered it necessary to introduce new limits for the genus. Many additional names have been proposed by various authors (Carpenter, 1855-7; Monterosato, 1884; Sacco, 1892, and others) for these new divisions, which need much careful study and

will be further discussed in the article on the genus now in course of preparation.

Turbonilla interrupta (Totten) H. and A. Adams.

Turritella interrupta Totten. Amer. Jour. Sci., xxviii, p. 352, fig. 7, 1835.

This very much misinterpreted species was described by Totten, as follows:

"Shell small, subulate, brownish; volutions about ten, almost flat, with about twenty-two transverse, obtuse ribs, separated by grooves of equal diameter, and with about fourteen subequal, impressed, revolving lines, which are arranged in pairs, and entirely interrupted by the ribs; below the middle of the body-whorl, the ribs become obsolete, and the revolving lines continuous; aperture ovate, angular above, regularly rounded below, about one-fifth the length of the shell; right lip, sharp, indistinctly sinuous; length, .22 of an inch; breadth, .07."

Dredged in Newport, R. I., harbor.

The number of specimens is not given, but, as the description is so clearly defined, it is safe to assume that there was only the figured one. My efforts to find whether or not it is still in existence have been unsuccessful.

The specimens found in Dartmouth harbor, Mass., and identified as this species by Prof. C. B. Adams, are still in the cabinet at Amherst College, where I have recently examined them and found that none agree with the original descriptions or figure. Adams² mentions that he identified them by the description, but calls attention to the great variation among them, as follows:

"The number of transverse ribs is seldom less than twenty-five, and often exceeds thirty. Above the body-whorl, the number of revolving lines does not exceed eight. The arrangement of them in pairs does not distinctly appear in these specimens."

These facts have been overlooked by more recent authors and these specimens have always been recorded, as the second authentic specimens to have been found. They really represent four (4) distinct species. One specimen (*a*) has the form of *T. areolata* Verrill, but the five (5) spiral lines are not so evenly spaced as in that species. Three specimens (*b*) have the general form of Totten's figure, but there are only five (5) nearly equally spaced,

² Boston Journal Nat. Hist., ii, p. 275, 1833.

coarse, spiral lines on the intercostal spaces; they are examples of an undescribed species or possibly a variety of *T. elegans* Verrill. Two specimens (*c*), one badly worn and one young, have the whorls slightly more convex, with seven (7) equally separated, coarse, incised lines between the ribs, and agree with U. S. F. C. specimens of an undescribed species found abundantly in Vineyard Sound. One specimen (*d*), badly worn, is like another undescribed U. S. F. C. species, a comparatively few specimens of which have also been found in Vineyard Sound. The spirals are of unequal size and are arranged in two wide, deep, but little separated grooves, just above the suture; a group of three similar grooves, a little above the middle of the whorls, above and below which are about seven fine, incised lines, sometimes a few finer ones appear, so that there are in all from twenty to twenty-two lines. An example with about 10 whorls is over 7 mm. long and 2 mm. in diameter.

An example of this species, labelled *T. interrupta*, thought to have been identified by Stimpson, has been sent to me by Dr. Dall. Several very poor ones (Nos. 79,008 and 68,426) found at Sea Isle City, N. J., were also received from Philadelphia.

Gould, in his first report on the Invertebrates of Massachusetts (1841, p. 268), redescribes and figures the species, but evidently did not have access to the type, as the figure is very unlike Totten's, and the ribs and spirals are given as follows:

"From twenty-five to thirty straight, blunt ribs crossed by about fourteen revolving lines which are interrupted by the ribs; these lines are arranged in pairs, but so close to each other as not always to be distinguished, and would usually be regarded as one."

Prof. John M. Clarke has recently very courteously consulted the records of the State Museum, Albany, N. Y., and failed to find such a species in the Gould collection, so that the above remarks probably applied to Adams' specimens.

Stimpson, 1851, records additional examples which he found in Boston harbor.

As the locality of the type was Newport, R. I., harbor, it is safe to assume that the species could also be found in the near vicinity, at Narragansett bay; but none of the southern specimens in this collection, identified as *interrupta*, are at all like any form found by the U. S. F. C. in that locality. Figures and descrip-

tions of these northern species will soon be published so that the true *interrupta* may be clearly understood.

All of these forms are distinct from *T. rufa* Philippi, specimens of which, collected in 8-10 fathoms, Church Bay, Ireland, have recently been received from Mr. Chaster, of Southport, England. In these, there are but five, unevenly spaced, incised, spiral lines on the intercostal spaces and three or four, finer ones on the base. In specimens from the same locality, of the smaller, distinct species, *T. fulvocincta* Thompson, the intercostal spaces have a wide, uninterrupted portion next the suture, below which there are six incised lines, varying in size in different specimens, and five, distinct ones on the base. An example with 9 whorls is $6\frac{1}{2}$ mm. long. Two specimens from off Cape Hatteras, N. C., labelled as var. *fulvocincta* Jeffreys, sent me by Dr. Dall, differ decidedly from these. Both have 9 whorls, but differ in length, one measuring 5, the other $5\frac{1}{2}$ mm. The intercostal spaces are cut by unequal spiral lines, varying in number; six or seven, wide and deep ones below, and six or twelve finer ones above, the upper ones scarcely visible.

In 1866, Mr. Krebs, of St. Thomas, W. I., visited Amherst College, and afterwards published "Remarks on the C. B. Adams' Collection," in the *Annals of New York Lyceum*, viii, p. 395, 1866.

Those relating to the species of *Chemnitzia* are as follows:

"*Chemnitzia exilis*, *C. flavocincta*, *C. laevis* and *C. subulata* are very like each other.

"*Chemnitzia multicostata* and *C. substriata*, when a sufficient number of specimens are at hand, may prove to be synonyms.

"*Chemnitzia obeliscus* is described from three fragments of different individuals and *C. puncta* from two miserable specimens.

"One species from Jamaica, seven from St. Thomas and three from West Indies are without names."

These show that Adams' specimens must either have been very poor or that the collection, as suggested by Mörch, 1875, had been disarranged when Mr. Krebs made these notes. It certainly is a little peculiar that such different species so carefully described by Adams should be so grouped. It is very unfortunate that only the empty trays are now to be found in the cabinet, the specimens themselves having been taken from the cases and not returned. It is owing to these facts that the present collection is of peculiar

importance, as it contains the specimens figured in Tryon's *Manual* as Adams' species.

Turbonilla Pilsbryi, new species. Plate VIII, fig. 9.

Shell of good size for the genus, stout, pure opaque white, in some places semitransparent, lustrous, regularly coiled, with the entire surface, except the nucleus and ribs, covered by numerous, unequal, spiral grooves, so crowded that the spaces between them appear like fine, uneven threads. Whorls swollen, indistinctly bevelled on the top, 6 below the prominent, oblique, flattened nucleus. Suture distinct. Transverse ribs about 26, very delicate, scarcely more than little raised lines, slightly oblique, the inclination toward the aperture (to the right), separated by wide, shallow spaces. Body-whorl elongated, well-rounded, with the ribs extending well over the base, gradually decreasing in size to the inner-lip. Aperture oblique-ovate with continuous peritreme; inner-lip represented by a thin glaze; columella having an obscure, median, toothlike swelling; outer-lip thickened within, with well-rounded edge.

Length, about $4\frac{1}{2}$ mm.; diameter, about $1\frac{1}{2}$ mm.; length of aperture, about 1 mm.

One specimen (No. 72,045) found at St. Thomas, W. I., by R. Swift.

This very beautiful species was labelled as *T. Riisei* Mörch, which was originally described by Mörch (*Syn. Moll. Mar. Ind. Occid.*, p. 165, 1875) as having the form of *Rissoina Catesbyana* d'Orbigny (*Hist. l' Ile de Cuba*, atlas, Pl. XII, figs. 1, 2). The type from St. Thomas, W. I., collected by Riise, was club-shaped, thick, deep yellow, white at the suture, with two darker bands, the superior one near the suture and the other median, with very delicate spiral striæ. Costæ numerous, about 40, continuous to the aperture, which is ovate with a continuous thickened peritreme, with a thickened white lip and an indistinct columellar fold. Length, $3\frac{1}{2}$ mm.; diameter, $1\frac{1}{3}$ mm.

The figure given by Tryon (*Manual*, Pl. 76, fig. 27), although said to be figured from the type, represents a species very different from either form.

Turbonilla asperula, new species.

Shell small, slender, golden brown, with slight lustre, consisting of 6 moderately convex, somewhat shouldered whorls below the

prominent oblique nucleus of but little over one whorl. Transverse ribs 26, slender, prominent, oblique (inclined to the right), with a decided angle at the shoulder of the whorls, and extending over the periphery of the body-whorl, gradually decreasing in size on the base. Interspaces wide and deep, crossed on the last whorl by 5 (sometimes 6) about equal and evenly spaced, raised, rounded, spiral lines, the first just at or a little below the shoulder, and the last just at the periphery; under the microscope they appear to render the sides of the ribs very irregular and the alternating spaces are crossed by scarcely discernible striae. Base elongate, ornamented between the ribs by 4 more prominent, widely separated, raised, spiral lines, below which there are ill-defined fine ones; aperture ovate; peritreme continuous.

Length of the largest specimen, 3 mm.; diameter, 1 mm.; length of aperture, about $\frac{4}{5}$ mm.

Five specimens of this very distinct species were found at Bermuda by Prof. Verrill and party, 1898.

Turbonilla pupoides d'Orbigny. Plate VIII, fig. 5.

Chemnitzia pupoides d'Orb., Hist. l'Ile de Cuba, i, p. 224; atlas, Pl. XVI, figs. 32-36, 1853.

Chemnitzia (Mumiola) pupoides Mörch, Syn. Moll. Mar. Ind. occid., p. 164, 1875.

Turbonilla pupoides Tryon, Manual, viii, p. 332, pl. 76, fig. 26, 1885.

? *Odostomia phrikalea* Watson, Report Voy. Challenger, Zool. Scaphopoda and Gasteropoda, xv, p. 493, Pl. XXXII, fig. 7, 1885.

A single specimen (No. 72,056) in the R. Swift collection, without locality, was labelled as this species, but is too poor to identify with certainty. It has 7 flattened, regularly increasing whorls below the apparently blunt, little raised, tilted nucleus, and in form and size agrees with d'Orbigny's figure.

The 24 straight, prominent, transverse ribs are perpendicular on the upper whorls and oblique (inclined to the left) on the lower ones and extend over the base, gradually decreasing in size. These are separated by wider, deep spaces which, under the microscope, appear much deeper near the suture than below, giving a constricted appearance to the whorls without affecting the ribs. Base elongated, rounded, ornamented between the ribs, except on the lowest portion, by about 7 raised, spiral threads separated by nearly uniform, deep spaces. Such lines are represented in d'Orbigny's figure, but none are mentioned in his description. The specimen

is so worn and encrusted that other spiral sculpture, if present, cannot be determined. Under the microscope the whorls are seen to be well-lapped with a rounded undulating edge turning well out at the deep suture. The aperture is broken.

Two other specimens (No. 72,048), also of the R. Swift collection, were labelled *T. flavocincta* C. B. Adams, but the figure given in Tryon's *Manual*, as made from a specimen, does not represent either of them. These differ in some respects from the above example, but agree with others found at Bermuda by Prof. A. E. Verrill and party in 1898. Among these, which number over 40, there is considerable variation. The nucleus is usually but little raised, but sometimes is quite prominent and oblique; the number of lines on the base varies from 7-10, with finer ones below; the number of ribs varies from 22-26, sometimes 30 or more when the specimen has been injured; they are usually straight, sometimes slightly curved, usually perpendicular, sometimes oblique. Some specimens have on the upper portion of the intercostal spaces, two well-separated, inconspicuous grooves, and on fresh examples which are yellow-white, semitransparent and lustrous with bands of waxen color at the sutures and on the periphery of the body-whorl exceedingly fine striae appear under the microscope. The aperture is ovate, lustrous within, when fresh, with continuous peritreme, the inner-lip represented by a thin layer of enamel having a delicate free edge. The shell increases regularly in diameter to the 6th or 7th whorl, and beyond the increase is more gradual.

Length of a 7-whorled specimen, $3\frac{1}{2}$ mm.; diameter, 1 mm.; length of aperture, about 1 mm.

A worn dead specimen dredged by the "Challenger" in 390 fathoms off Culebra, W. I., was described and figured by Watson as *Odostomia phrikalea*. It agrees so closely with the above examples that there is little doubt of its being the same species.

***Turbonilla pupoides* variety *ischna*, new.**

Four specimens (No. 79,014) differ from the typical form, in being much more slender. After the 4th or 5th whorl the increase in diameter is so gradual that the sides of the spire appear nearly parallel. Specimens 4 mm. in length, being of the same diameter as others of but about half that length. Over a dozen of this form were among the Bermuda specimens.

Turbonilla textilis (?) Kurtz. Plate VIII, fig. 2.

Chemnitzia textilis Kurtz, Cat. Mar. Shells, p. 8, 1860.

Turbonilla textilis Tryon, Amer. Mar. Conch., p. 65, 1873; Manual, viii, p. 329, pl. 75, fig. 12 (variety), 1885.

Shell small, rather stout, bluntly tapered, white, semitransparent, of dull lustre, with swollen whorls bevelled above, just below the suture, forming a rounded shoulder and having a few, coarse, spiral grooves on the interspaces and a few, raised, spiral threads on the base. Suture linear. Whorls 6 below the good-sized, oblique, flattened nucleus. Transverse ribs, which extend a little below the periphery of the body-whorl, are 26, narrow, rounded, prominent, perpendicular, but a very little inclined to the right on the last whorl, their sides rendered uneven by the cutting in of the spiral grooves, separated by wider, deep spaces, which are crossed by 5 wide, deep, spiral, grooves of about equal size and evenly separated, the top one just at the shoulder of the whorls. Base elongated, rounded, cut by two equally wide, well separated, deep, spiral grooves, interrupted by the ribs which here disappear; below, there are four or five, raised, spiral threads separated by shallow grooves. Aperture very smooth and lustrous within, elongate-ovate with the pillar-lip thin and reflected, especially below.

Length, $3\frac{1}{2}$ mm.; diameter, $1\frac{1}{2}$ mm.; length of aperture, 1 mm.

Two live specimens (No. 72,051) found in two fathoms at Marco, Fla., by Mr. H. Hemphill. A badly worn young specimen from Station 2,114, off Cape Hatteras, N. C., in fourteen fathoms, dredged by the U. S. F. C. in 1883, agrees closely with these, but is too poor to identify with certainty. The same is true of an example from Bermuda.

They are easily recognized by the distinctly shouldered whorls and coarse spiral grooves, and may be examples of the true *textilis* of Kurtz. "Whorls shouldered" is the only feature given in the original description which separates that species from many others.

Two small, live specimens (No. 72,043) in the R. Swift collection were collected by Stimpson on the coast of South Carolina and were labelled as *T. textilis* Kurtz, and figured by Tryon. Both have the apex somewhat eroded and the body-whorl has been injured and repaired. They are more slender than the typical form (No. 72,051). The larger has 6 moderately swollen, not distinctly shouldered whorls, below the rather prominent, oblique, flattened

nucleus. Suture well impressed. Transverse ribs about 20, narrow, rounded, perpendicular, separated by wider, shallow spaces which are crossed by 5, wide, deep, spiral grooves. Body-whorl slightly angulated at the periphery, rounded and elongated below, crossed by two, wide grooves, interrupted by the ribs, and below by four or five, rather indistinct, raised, spiral threads and wider grooves.

Length, 3 mm.; diameter, 1 mm; length of aperture, $\frac{4}{5}$ mm.

As the well impressed suture gives only a well-rounded summit, and not a distinct shoulder, to the whorls, these specimens cannot be examples of the true *textilis*, but are doubtless a variety of No. 72,051, from which they differ in having flatter whorls, more tapered apex and little rounded base. The form of the aperture in the variety is somewhat angular, expanded below with the columellar-lip straighter, thin and reflected, forming an angle at its juncture with the outer-lip.

Turbonilla fasciata d'Orbigny (?).

Chemnitzia fasciata d'Orbigny, Voy. Amer. Mérid, p. 496, pl. 76, figs. 4-6, 1847 (?); Möreh, Syn. Moll. Mar. Ind. occid., p. 164, 1875.

Turbonilla fasciata Tryon, Manual, viii, p. 331, pl. 76, fig. 25, 1885.

Not *Chrysallida fasciata* Carpenter, 1857, nor *Odostomia fasciata* Dunker, 1860, nor *Dunkeria fasciata* Tenison-Woods, 1875.

A few specimens (12) from Bermuda differ from forms of *pupoides* in the greater size and prominence of the very oblique nucleus and in the much shortened, little rounded base over which the transverse ribs do not extend, but become evanescent near the abruptly rounded periphery of the body-whorl. The aperture in all of them is badly broken. The peritreme does not appear to be continuous and the pillar-lip is reflected and considerably thickened, especially below. On some, there are slight indications of spiral lines on the intercostal spaces. Raised, rounded, spiral threads ornament the base.

Length of the largest example, $2\frac{4}{5}$ mm.; diameter, $1\frac{1}{5}$ mm. Length of the smallest, $1\frac{1}{2}$ mm.

D'Orbigny's original description and figures are not accessible to me, but the above characters seem to agree with those given by Tryon.

The line next the figure, indicating its size, as given by Tryon, measures 5 mm., but in the text the size of the species is given as 3 mm.

Turbonilla Stimpsoni, new species. Plate VIII, fig. 7.

Shell pure white, slender, with elongated whorls, causing the apex to appear very pointed. Whorls flattened, 9, besides the elongated, smooth, shining, prominent, slightly oblique, flattened nucleus. Suture deep, forming distinct notches in the otherwise straight outlines of the spire, scalloped by the ends of the numerous ribs. These are about 36, narrow, rounded, very oblique (inclined to right), separated by much narrower, rather deep spaces which are crossed by nearly equal, but irregularly spaced, incised lines which form deep pittings. Under a half-inch pocket lens 9 can be counted which increase to 10 or 11 under the microscope, and are seen to cut into the sides of the ribs. On the base the ribs merge into prominent lines of growth which are cut by four widely separated, conspicuous, revolving lines, with a few very fine ones below. Base well-rounded. Aperture elongate-ovate, with the pillar-lip curved and moderately thickened.

Length, $5\frac{2}{5}$ mm.; diameter, 1 mm.; length of aperture, 1 mm.

One specimen (No. 72,042) in the R. Swift collection was found by William Stimpson on the Carolina coast, and was labelled as *T. interrupta* (Totten). It is very unlike all the known northern forms. The *T. ornata* d'Orbigny, 1853, not Gould, 1861, has ribs which extend over the base, but according to d'Orbigny's figure, they are coarser, fewer in number and perpendicular; the whorls are more convex, the spire less acute and the spirals more numerous (*Hist. l'Ile de Cuba*, i, p. 221, atlas, Pl. XVI, figs. 18-20).

Turbonilla incisa, new species. Plate VIII, fig. 12.

Shell of medium size, moderately stout, white, semitransparent and lustrous, when fresh, with coarse, spiral, incised lines in the intercostal spaces and on the base. Suture well marked. Whorls flattened, 9 below the rather prominent, slightly oblique, flattened nucleus. Transverse ribs 20, broad, bluntly rounded, straight, perpendicular, with wider, shallow interspaces crossed by 7, rarely 6, coarse, unequal, incised, spiral lines or grooves, about evenly separated. In one example having 6 lines, the last, just above the suture, is very much broader and deeper than the others. Base well-rounded, cut by about 7, evenly spaced, incised, spiral lines. Aperture somewhat elongated; pillar-lip straight, thin, slightly reflected.

Length of the largest example, $6\frac{2}{3}$ mm.; diameter, $1\frac{4}{5}$ mm.; length of aperture, $1\frac{2}{3}$ mm.

Three specimens (No. 62,800) from West Florida were presented by Mr. C. W. Johnson, 1891.

The more slender *Turbonilla virga* Dall is a closely related species. In a specimen sent to me by Dr. Dall, the 10 flattened whorls (nucleus wanting) are much more gradually tapered so that it is but about one-half as wide as an example of *incisa* of the same length and the 7 incised lines are equal, and under the microscope appear to cut into the sides of the transverse ribs.

Turbonilla incisa variety *constricta*, new.

Two specimens (No. 79,023) from the same locality are of moderate size, slender, irregularly coiled (abruptly contracted in the 6th and 7th whorls), semitransparent, pale yellow (when fresh), with a broad band of brown on the base, and a fainter one at the suture. Upper whorls moderately convex, lower ones flattened. Suture well marked. Whorls 10 below the prominent, oblique, flattened nucleus. Transverse ribs irregularly developed, thin, narrow, but little raised, separated by wide, shallow spaces. On the 5th whorl, the interspaces are wide, but become much narrower on the 6th whorl with more delicate and more numerous ribs, while on the 8th whorl they again become wider, with much stronger ribs; and on the last whorl the ribs number about 26. Base well-rounded, cut by about 7 fine, incised, unevenly separated, spiral lines, the upper one the most distinct. Aperture ovate; pillar-lip thin, well reflected. The spirals on the upper whorls are arranged as in typical *incisa*, but on the lower ones, in the larger specimen, they number 7, but are of equal size, and evenly spaced; under the microscope 2 or 3 finer ones appear below the suture, and on the middle of the whorls; also on the lower portion of the base, numerous, still finer ones. When young, this variety could not be separated from the typical examples, but the peculiarity in its development, seen even in one with 7 whorls easily distinguishes it, at least as a variety.

Length of the larger specimen, $6\frac{1}{3}$ mm.; diameter, 1.5 mm.; length of aperture, $1\frac{1}{5}$ mm.

Turbonilla elegans Verrill (?) variety (?).

Turbonilla elegans Verrill. Amer. Jour. Sci., iii, p. 282, Pl. VI, fig. 4, 1872; Invert. Ani. Vineyard Sound, p. 363, Pl. XXIV, fig. 155, 1874.

Not *Chemnitzia elegans* d'Orbigny, 1853, nor *Odostomia elegans* A. Adams, 1860, nor *O. elegans* Monterosato, 1869.

Shell of good size, amber-colored, semitransparent, lustrous. Apex broken, remaining whorls 8; the upper ones are somewhat eroded, but the last one is well-rounded. Transverse ribs 22, rounded, straight, nearly perpendicular, separated by about equally wide shallow spaces which are crossed by 5 equal, well-separated, incised, spiral lines, and 2 (the 1st and 5th) very much finer ones. Base well-rounded, cut by 6 distinct, widely, unevenly spaced, incised, spiral lines. Aperture elongated; pillar-lip straight, thickened, slightly reflected below.

Length, 6 mm.; diameter, $1\frac{1}{2}$ mm.; length of aperture, $1\frac{1}{2}$ mm.

One specimen (No. 60,125) off Micco, Indian river, Fla., in two fathoms, mud. This is considerably larger than any of the northern examples of *elegans* Verrill, but so closely agrees with them in form that with a sufficient series it may prove to be a southern variety.

As the *Chemnitzia elegans* d'Orbigny (1853) is not a *Turbonilla* (in its peculiar thickened base, at which the transverse ribs terminate abruptly, it shows its close relation to *Cerithium turrita* Stearns from Florida), and *Odostomia elegans* A. Adams (1860) is spirally ornamented, and *O. elegans* Monterosato (1869) is smooth, Prof. Verrill's name need not be changed.

Turbonilla sp.?

A young specimen (No. 79,006) from off Micco, Indian river, Fla., is amber-colored, semitransparent and lustrous, rather stout, with distinct suture. The upper portion is wanting, the 6 remaining, somewhat flattened whorls are crossed by about 24, narrow, low, slightly oblique ribs inclined to the right, separated by wider, shallow spaces. These are crossed by about 8 (6 about equal and 2 more indistinct) unequal and unevenly spaced, incised, spiral lines. Base well-rounded, cut by numerous (about 15) fine, wavy, incised, spiral lines. Aperture ovate; pillar-lip curved, thin, slightly reflected.

Length, $3\frac{1}{2}$ mm.; diameter, $1\frac{1}{2}$ mm.; length of aperture, 1 mm. With a sufficient series, this might prove to be the same as a similar undescribed species common in Vineyard Sound and vicinity.

Turbonilla sp.?

Another young, imperfect specimen (No. 79,007) from the same locality has only the 6 lower whorls, the last one crossed by about 20 transverse ribs which are rounded, straight, and perpendicular, separated by about equally wide, shallow spaces which are cut by about 6 unequal, incised, spiral lines which increase to 10 under the microscope. Base well-rounded, cut by about 10 fine, incised, unevenly spaced, spiral lines. Aperture elongated; inner-lip straight, thin and reflected.

Length, $4\frac{1}{2}$ mm.; diameter, $1\frac{1}{2}$ mm.; length of aperture, about 1 mm.

Turbonilla *Conradi*, new species. Plate VIII, fig. 10.

Shell large, regularly coiled, stout, dirty waxen gray, ornamented with coarse and fine, incised, spiral lines on the intercostal spaces and base. Whorls 12, slightly convex, below the prominent, nearly flattened nucleus, transverse to the axis. Suture well marked, slightly undulating. Transverse ribs, about 22, broad, rounded, straight, slightly oblique, separated by wider, shallow spaces crossed by 4 conspicuous, incised lines, and several indistinct, finer ones. One just above the suture forms a wide and deep groove, another similar one at the middle of the whorls, on either side and well separated from this, a distinct line, the three forming a conspicuous band; above and below this there are other indistinct lines which, under the microscope, number 6 on each space; 2 others also appear on each side of the median groove. Base well-rounded, cut by 3 distinct, well-separated, incised, spiral lines and several finer ones below. Aperture squarish, well-rounded; pillar-lip straight, thickened, well reflected.

Length, $8\frac{1}{2}$ mm.; diameter, about 2 mm.; length of aperture, $1\frac{1}{2}$ mm.

One specimen (No. 72,052) was found by Courad at Tampa Bay, Fla.

An undescribed species found off Cape Hatteras, N. C., has a band of three unequal incised lines on the middle of the whorls, but in other characters it is quite unlike. The *T. viridaria* Dall also bears a superficial resemblance to it, but when placed side by side the two are found to be very different.

Turbonilla Rushii, new species. Plate VIII, fig. 11.

A specimen with the upper portion badly worn is of good size, moderately stout, of 12 (minus the nucleus) regularly coiled whorls, nearly flat, with but a slight convexity a little above the well marked suture. Transverse ribs about 24, a little oblique, inclined to the left, rather narrow, rounded, with much wider, concave interspaces, which are crossed by unequal, incised lines. Under a half-inch pocket lens there are two near the suture and two above the periphery which form pairs of deep grooves of unequal width; besides these the surface is scratched by numerous, fine, unequal and irregularly spaced lines; 8 between the two sets of grooves; still finer ones above, on the upper portion of the whorl and 1 between the two lowest grooves. Under the microscope, a few more lines appear. Base rounded, crossed only by numerous fine, nearly equal, incised, revolving lines. Aperture somewhat elongate; outer-lip broken.

Length, $9\frac{1}{2}$ mm; diameter, $2\frac{1}{2}$ mm.; length of aperture, about 2 mm.

One specimen (No. 70,535) collected by Dr. William R. Rush, at Maldonado Bay, in 3-6 fathoms, Uruguay, was labelled as *T. interrupta* Totten. In form it is nearest the *T. viridaria* Dall, with specimens of which it has been compared, but the number and arrangement of the spiral sculpture easily distinguish it. It is very distinct from *T. dispar* Pilsbry,³ from the same locality, which has 8, somewhat convex whorls below the somewhat flattened nucleus, transverse to the axis, with ill-defined transverse ribs, the interspaces crossed by 6 unevenly separated, spiral grooves which form oblong punctures.

This is a similar but much larger species than *T. areolata* Verrill, 1874, not Rayneval.

Turbonilla pyrrha, new species. Plate VIII, fig. 1.

Shell of moderate size, regularly coiled, delicate yellow (when fresh), thin, semitransparent, the interspaces and base cut by a few, unevenly separated, incised, spiral lines. There are ten slightly convex whorls below the prominent, shining, slightly oblique, flattened nucleus. Suture moderately deep. Transverse ribs about 40, very delicate, but little raised, perpendicular, sepa-

³ These Proceedings, p. 296, Pl. VI, figs. 5-7, 1897.

rated by wider, shallower spaces which are crossed by comparatively few, incised, irregularly spaced lines, and also by a wide, deep, sutural groove, often stained by oxide of iron. Well separated from the groove, there is a group of from 5-7 equal and evenly spaced lines and a considerable distance above are 4 or 5 somewhat wider, unevenly, but well-separated lines. Base well-rounded, cut by about 7 conspicuous, incised spirals, about evenly spaced. Aperture somewhat elongated, well-rounded; pillar-lip straight, thin, reflected.

Length of the largest example, 6 mm.; diameter, $1\frac{1}{3}$ mm.; length of aperture, $1\frac{1}{3}$.

Three specimens (No. 72,050) from St. Thomas, W. I., and two worn specimens (No. 79,020) without locality. Some of them were labelled as *T. subulata* C. B. Adams, 1850 (not Holmes, 1860) and figured by Tryon. That species was described as "much elongated, subulate, white, or pale brownish white with two spiral bands of pale wax color and a third of the same color anteriorly. Spire with a slightly curved axis, outline scarcely convex; whorls ten, beside the moderately oblique nucleus; rather convex with suture well impressed. Transverse ribs, 28-30, prominent, slender, extending below the convexity of the body-whorl; the interspaces and base crossed by numerous, exceedingly fine crowded spiral striæ, of which one next below the suture is larger. Aperture ovate, acute above, labrum slightly thickened. L., .17; B., .045 inches."

Two smaller specimens (No. 79,017) having only 9 whorls differ from the typical ones in having 42 ribs, two wide, deep grooves on the interspaces, one at the suture and one above the middle of the whorls, between which, and equally well separated from them, a group of 7, equal and evenly spaced, incised lines; above, near the suture, are also two incised lines. These are designated as variety *a*. A badly worn specimen (No. 79,021), without locality, also has 42 delicate ribs.

Three, opaque white, weather-worn specimens (No. 72,053) were labelled *T. puncta* C. B. Adams, and figured by Tryon. In outline they agree with specimens (No. 72,050), but they have but 30 transverse ribs, with the shallow interspaces crossed by a sutural groove and well separated from it, a group of 5, equal and evenly spaced, incised lines, and a considerable distance above,

reaching to the suture, 4 evenly spaced ones, the lower one sometimes a little larger than the others. These are designated as variety *b*.

Length of the largest, $5\frac{1}{2}$ mm.; diameter, 1 mm.

Another example (No. 72,054), without locality, was labelled as *T. turris* d'Orbigny, which is described as a very elegant, elongated, very acute, thin, white species of 14 somewhat flattened whorls. Transverse ribs (according to the figure) about 24, narrow, perpendicular, with spiral lines only on the base. Suture impressed. Aperture subtrapezoidal; labrum thin, columellar-lip thickened, straight.

Four specimens (No. 79,018) have more elongated whorls than the typical examples (No. 72,050), so that specimens of the same number of whorls are a little longer. The transverse ribs number but 28 in the largest specimen, in the others, 30. The interspaces are crossed by a sutural groove, above and well separated from it, a group of 5 incised lines; some distance above, a single more distinct line and at an equal distance above, a group of 3 finer ones which reach to the suture. This is called variety *c*. A single specimen (No. 79,022), without locality, differs in having the single line above the periphery as wide and deep as the sutural groove.

Three specimens (No. 79,019) have but 32 ribs and 2 spiral grooves as in variety *a*, but the lower group of incised lines numbers from 7-9, and the upper, 5. This is variety *d*.

***Turbonilla puncta* C. B. Adams.**

Chemnitzia puncta C. B. Adams, Cont. to Conch., No. 5, p. 72, 1850; Möreb, Syn. Moll. Mar. Ind. occid., p. 162, 1875.

Turbonilla puncta Tryon, Manual, viii, p. 331, not Pl. 76, fig. 22, 1885; (?) Dall, Bull. U. S. Nat. Mus., No. 37, p. 128, 1889.

C. B. Adams described this as a much elongated, white species of rectilinear outline with 10 or 11, besides the nucleus, scarcely convex whorls with distinct suture. Transverse ribs 26-30, rather prominent, the interspaces crossed by numerous crowded spiral striae, one of which, a little above the middle and another at the suture, are wide and deep, resembling spiral series of punctures. Aperture ovate, rhombic; labium scarcely thickened. L., .22; B., .05.

According to Mr. Krebs, of St. Thomas, W. I., who examined the Adams collection in 1866, there were but two miserable speci-

mens. A number of specimens found in from 1-10 feet water at Bermuda by Prof. A. E. Verrill and party, 1898, differ from the above only in having the fine lines also on the base.

An example with the animal consists of 10 flat whorls below the prominent, slightly oblique, flattened nucleus. Opaque white with little lustre, rather stout, regularly coiled. Suture distinct. Transverse ribs 30, narrow, rounded, perpendicular, with wider, deep interspaces cut by numerous, crowded, incised, spiral lines separated by fine, nearly uniform, raised threads, and two very wide and deep grooves, one at the suture and one above the periphery of the whorls, between which, under the microscope, the incised lines number about 26, and between the upper one and the suture about 16. Numerous, crowded, incised, spiral lines entirely cover the slightly rounded base, but the spaces between them are wider and flat, rendered wavy by conspicuous, irregular lines of growth. Aperture elongated; pillar-lip but little thickened, straight and slightly reflected.

Length, $6\frac{1}{2}$ mm.; diameter, $1\frac{1}{2}$ mm.; length of aperture, $1\frac{1}{2}$ mm.

Fragments (No. 79,016) without locality were found with the following species.

Another specimen from Bermuda differs in being much stouter, with 9 shorter whorls with somewhat angular body-whorl, and having only 24 transverse ribs, and but 20 incised lines between the grooves on the interspaces. In specimens which have been injured, the number of ribs is over 40.

The *T. punicea* Dall is a related species, and was dredged in considerable numbers in shallow water off Cape Hatteras, N. C., by the U. S. Fish Commission in 1883-1884. It is a small, slender species, with rounded base cut by several (about 7) fine, irregularly arranged, incised, spiral lines. The transverse ribs are little prominent with their interspaces cut by two distinct shallow grooves, one sutural and the other a little wider, peripheral, between which are fine, incised, unequally separated, spiral lines which vary in number from 4-7 above and below the middle groove; their distinctness and arrangement very inconstant. There is also a variety having still more numerous, finer and more regularly arranged lines, 8 below and 8-13 above the peripheral groove. An example loaned me by Dr. Dall is of a dull waxen color, changing to pinkish brown on the last whorl and has twelve, some-

what flattened whorls below the nucleus, which is injured. There are about 20 transverse ribs on the body-whorl, thin, narrower than their interspaces which, under the microscope, are crossed by about 7 fine lines below and from 4 to 7 above the central groove. The lines show more clearly in some positions than in others.

Length, 8 mm.; diameter, $1\frac{3}{5}$ mm.; length of aperture, $1\frac{2}{3}$ mm.

Turbonilla substriata C. B. Adams.

Chemnitzia substriata C. B. Ad., Cont. to Conch., No. 5, p. 73, 1850; O. A. L. Mörch, Syn. Moll. Mar. Ind. occi., p. 162, 1875.

Turbonilla substriata Tryon, Manual, viii, p. 330. pl. 76, fig. 21 (very poor), 1885.

“Shell moderately elongated white, with a slight tinge of wax color next above the suture, with about 22–24 transverse, rather stout ribs; in the intercostal spaces and anteriorly with very numerous crowded excessively minute spiral striæ, which are scarcely perceptible under a common magnifier; on the middle of the whorls is a series of spiral shallow pits in the intercostal spaces; on the last whorl, with the anterior extremity of the intercostal spaces moderately depressed, below the surface of the anterior region; spire with rectilinear outlines; whorls about eight, planulate, with a distinct suture; aperture rhombic-ovate; labium scarcely thickened; umbilical region scarcely indented. Length, .115 inch; breadth, .04 inch.”

Two specimens (No. 72,046) without locality, were labelled as this species. They are white, semitransparent and lustrous. The nucleus is prominent, slightly oblique, somewhat flattened. The body-whorl subangulated at the periphery with a short, but little rounded base which, with the wide intercostal spaces are cut by numerous, very fine, shallow, incised, spiral lines, interrupted on the middle of the whorls by a much wider, inconspicuous, shallow line or groove, seen only in a good light, and under the microscope; above and below this, the spirals number about 30. The ends of the spaces are very deep, but the fine spirals cover the entire surface.

Length of the larger specimens, $3\frac{1}{5}$ mm.; diameter, $1\frac{1}{5}$ mm.; length of aperture, 1 mm.

This species is closely related to *T. puncta* C. B. Adams, but the whorls are shorter, the ribs narrow, perpendicular, with wide interspaces, and the spirals are not so deeply cut.

Turbonilla unilirata, new species. Plate VIII, fig. 6.

Shell small, very slender, gradually tapered, dead white (weather worn), without incised, spiral lines on the intercostal spaces and base. Whorls very slightly convex, 9, in the largest example, below the small nucleus, which is transverse to the axis, with very projecting whorls. Suture deep and straight. Transverse ribs narrow, rounded, slightly oblique, inclined to the left, varying from 20–24, with wider, deep, flattened interspaces ending at the periphery of the body-whorl with deeper, square-cut ends. The interspaces are crossed by a single, conspicuous, raised, spiral thread or lira, a little below the sutures. Base rounded, smooth. Aperture somewhat elongate; pillar-lip straight, thin and slightly reflected. In some of the examples the outer-lip is broken, revealing a spiral, tooth-like ridge on the columella.

Length of the type, 3 mm.; diameter, $\frac{4}{5}$ mm.; length of aperture, about $\frac{3}{5}$ mm. A larger specimen is $3\frac{1}{2}$ mm. long and about $\frac{4}{5}$ mm. wide.

Four specimens (No. 79,010) from St. Thomas, W. I., and a single worn, imperfect specimen, dredged by the U. S. Fish Commission, in 1884, off Cape Hatteras, N. C., at station 2,277, in 16 fathoms.

This species was labelled as *T. pusilla* C. B. Adams, 1850 (not Philippi, 1844), and appears to be the one figured by Tryon (*Manual*, Pl. 76, fig. 19) as an example of that species.

Turbonilla Penistoni, new species.. Pl. VIII, fig. 14.

Turbonilla pulchella Heilprin, The Bermudas, p. 173, 1889.

Shell white, exceedingly slender, gradually tapered, semitransparent, lustrous. Whorls moderately convex, 11, below the small nucleus of $2\frac{1}{2}$ very projecting whorls, transverse to the axis. Suture deep. Transverse ribs about 15 (the specimen has been injured) stout, rounded, oblique, slightly sigmoid, separated by about equally wide, deep spaces which terminate at the periphery of the well-rounded body-whorl with square-cut ends. Base rounded, smooth. Aperture somewhat elongated, with the pillar-lip straight, moderately thickened, reflected and forming a decided angle at its juncture with the thin outer-lip. Under the microscope the entire surface is covered with very fine, spiral striæ.

Length, $4\frac{1}{2}$ mm.; diameter, 1 mm.; length of aperture, about 1 mm.

The type (No. 70,024) was found by Prof. A. Heilprin and party at Bermuda in 1888, and identified as *T. pulchella* d'Orbigny, from which species it differs decidedly in its nucleus, more slender form, and oblique and curved ribs.

Several specimens and fragments were also found at Bermuda, in 10–40 feet, by Prof. A. E. Verrill and party, in 1898. In these, which are regularly developed, there are 18 ribs; but one example, the same size as the type, has the ribs inconstantly developed, there being 18 on the penultimate whorl and about 30 much fainter ones on the body-whorl. This irregularity seems due to a slight injury at the suture. There are also distinct lines of growth on the base and the angles of the aperture are rounded.

A single dead specimen (No. 79,011), without locality, in the R. Swift collection, has a similar prominent, projecting, transverse nucleus, convex whorls and form of aperture, but the 8 whorls increase very gradually, more so than in *T. Swiftii*, the base is but little rounded with a single brown spiral line. There are 16 transverse ribs.

Length, 3 mm.; diameter, about $\frac{2}{3}$ mm.

With a sufficient series, this may prove to be the young of a distinct species as the proportions are so unlike other examples of this species.

This beautiful shell is named in honor of Miss Annie Peniston, of Bermuda, who, through her keen interest in collecting specimens, has aided so much in increasing the knowledge of Bermuda shells.

Turbonilla Swiftii, new species.

Shell much elongated, very slender, gradually tapered, semi-transparent, lustrous. Whorls slightly convex, 13 in the most perfect specimen (16 or 17 in the largest, which is broken away at the top) below the prominent nucleus which is oblique, of $2\frac{1}{2}$ projecting whorls. Suture very distinct, deep, linear, giving a noticeable clean-cut effect. Transverse ribs, varying from 20–26, rounded, narrow, oblique, more or less curved, separated by much wider, deep spaces, which terminate on the periphery of the body-whorl with more or less square-cut ends. Base rounded, smooth. Outer-lip broken in all the specimens, inner-lip thin, reflected; aperture somewhat elongate, expanded below, with rounded angles. In some specimens there is a spiral, tooth-like ridge on the pillar-lip. Fine, microscopic striae appear only on the base.

Length of the most perfect specimen, 6 mm.; diameter, 1 mm.; length of aperture, about 1 mm. The largest specimen, when perfect, probably measured over 7 mm.

Nine live and dead specimens (No. 72,055) from St. Thomas, W. I., in the R. Swift collection were labelled as *T. pulchella* d'Orbigny (not *Odostomia pulchella* A. Ad., 1861). That species seems, however, very different, for in a length of 7 or 8 mm. it is described as having but 12 convex whorls with the nucleus, which, according to the figure, is but slightly and peculiarly tilted. The number of transverse ribs is not given, but in the figure there are about 18, nearly perpendicular ones.

T. Swiftii differs from *T. Penistoni*, to which it is closely related, in its much more elongated, more evenly tapered form, deep suture, much narrower, more oblique ribs with wider interspaces, and especially in its less projecting, oblique nucleus.

***Turbonilla leuca*, new species.**

Shell small, slender, white, semitransparent with considerable lustre. Whorls convex, 9 below the prominent nucleus transverse to the axis, with $2\frac{1}{2}$ very projecting whorls. Suture well impressed. Ribs prominent, nearly perpendicular, slightly curved, from 20-24 (the last whorl has been injured), separated by little wider, deep spaces, terminating in rounded ends. Base well-rounded. Aperture somewhat elongated with curved, little thickened and reflected inner-lip.

Length, $4\frac{1}{2}$ mm.; diameter, $1\frac{1}{3}$ mm.; length of aperture, 1 mm.

One fresh and two dead specimens were found at Bermuda, by Prof. A. E. Verrill and party, 1898.

***Turbonilla Heilprini*, new species. Plate VIII, fig. 13.**

Shell small, very slender, gradually tapered, white, semitransparent, very lustrous, whorls moderately convex, 8 below the prominent, slightly oblique, nearly flat nucleus of $1\frac{1}{2}$ but slightly projecting whorls. Suture distinct, straight. Transverse ribs about 18, straight, nearly perpendicular, clean-cut, rounded, separated by equally wide, deep spaces terminating at the periphery of the body-whorl with square-cut ends. Base well-rounded, smooth. Outer-lip broken; inner-lip thickened. No microscopic striæ.

Length, $2\frac{1}{2}$ mm.; diameter, about $\frac{3}{5}$ mm.; length of aperture, $\frac{1}{2}$ mm.

The type (No. 79,009) was placed with *T. Penistoni*, from which it is readily separated by its small size, straight ribs and very different nucleus.

Turbonilla abrupta, new species. Plate VIII, fig. 4.

Shell of moderate size, rather stout, dead white, irregularly coiled. The first 3 or 4 whorls enlarge quite abruptly, while below the increase is very gradual. Whorls flattened, 9 below the small nucleus, transverse to the axis, with projecting whorls. Suture deep, nearly straight. Transverse ribs about 20, rounded, oblique, nearly straight, separated by wider, deep, flat-bottomed spaces which terminate just above the suture in very square-cut ends. Base well-rounded, smooth. Aperture somewhat elongated, expanded below with rounded angles; inner-lip thin, reflected.

Length, 4 mm.; diameter, 1 mm.; length of aperture, 1 mm.

One specimen (No. 79,012) from St. Thomas, W. I., in the R. Swift collection was labelled as *T. pusilla* C. B. Adams. That species is described as having 10 or 11 whorls below the very oblique nucleus, ornamented by 12 stout, transverse-ribs. L., .135; B., .03 inches.

Turbonilla inclinata, new species.

Shell small, slender, gradually tapered, dead white (weather worn). Whorls flattened, 9 below the small nucleus, which has very projecting whorls and is transverse to the axis. Suture deep and straight. Transverse ribs, about 20, exceedingly oblique, inclined to the left, straight, flattened, rather narrow, with wider, flat-bottomed, moderately deep interspaces terminating at the periphery of the body-whorls in square, clean-cut ends. Pillar-lip thin, reflected; outer-lip broken.

Length, about $3\frac{1}{2}$ mm.; diameter, $\frac{4}{5}$ mm.; length of aperture, about $\frac{3}{5}$ mm.

One broken, dead specimen (No. 72,044), from St. Thomas, W. I., in the R. Swift collection. It is very different from all other known species, and is easily distinguished by the great obliquity of the transverse ribs, in which character it resembles the much larger species, *T. Campanelle* Philippi.

Turbonilla compsa, new species.

One very poor specimen (No. 79,015), without locality, in the R. Swift collection, although without nucleus and with the outer-lip

badly broken, differs so decidedly from the other species in the abrupt taper of its spire, flattened whorls and numerous, nearly straight ribs, as to seem worthy of description.

It is small, opaque white, with considerable lustre, with upper portion much more abruptly tapered than the lower. The 8 whorls flattened, the only curvature being just above the suture which is so deep and straight that each whorl extends out abruptly beyond the preceding one. Transverse ribs irregularly developed due to an injury, about 30 narrow, perpendicular, straight on the upper whorls, becoming slightly curved above, on the lower whorls, separated by wider, moderately deep spaces, which end at the periphery of the well-rounded body-whorl in clean-cut, rounded ends. Base elongate, well-rounded. Inner-lip straight, thickened.

Length, $3\frac{2}{3}$ mm.; diameter, about 1 mm.

Turbonilla Dalli, new species. Plate VIII, fig. 8.

This is a large, stout, regularly coiled, very beautiful species, bluish white, semitransparent, with dull lustre. Suture unusually deep, but not channeled. Whorls very convex, 12 below the prominent nucleus of 2 projecting whorls transverse to the axis. Transverse ribs 16, often opaque white, very prominent, slightly oblique, separated by very deep, concave, about equally wide spaces, which terminate in clean, square-cut ends, sometimes just above the suture. Base short, moderately convex, smooth. Aperture squarish; the outer-lip thin, greatly expanded, turning in abruptly to meet the straight, much thickened, not reflected, pillar-lip in a rounded angle. The entire surface covered with exceedingly fine microscopic striae.

Length of largest specimen (apex gone), $8\frac{2}{3}$ mm.; diameter, $2\frac{1}{2}$ mm.; length of aperture, $1\frac{1}{2}$ mm.

Three live specimens (No. 72,049) were found at Sarasota Bay, Fla., by Mr. H. Hemphill. A single, large, imperfect specimen (No. 94,804, U. S. N. M.), from Cape Hatteras, N. C., loaned me by Dr. Dall, agrees perfectly with these specimens.

A poor worn specimen (No. 10,310, Peabody Museum), from Egmont Keys, Fla.

Turbonilla Hemphilli, new species. Plate VIII, fig. 3.

This species is closely related to the preceding, but is more slender, longer, with more pointed apex, smaller nucleus, less convex whorls, more numerous ribs and more elongated aperture.

Suture well marked. Whorls but slightly convex, 12 below the small nucleus, with projecting whorls, transverse to the axis. Transverse ribs about 20, rather stout, nearly perpendicular, rounded, separated by about equally wide, deep, concave spaces terminating at the periphery of the body-whorl in clean-cut ends. Base rounded, smooth. Aperture squarish, somewhat expanded below, with rounded angles; inner-lip thickened, reflected. Entire surface covered by very fine, microscopic striae.

Length of the largest specimen (apex gone), 9 mm.; diameter, 2 mm.; length of aperture, $1\frac{1}{2}$ mm.

Three live specimens (No. 79,013) were found at Sarasota Bay, Fla., by Mr. H. Hemphill.

Three poor, worn specimens (No. 10,302, Peabody Museum) from West Florida, collected by Col. Jewett.

Turbonilla atypha, new species.

Two badly worn, imperfect specimens (No. 70,537) from Maldonado Bay, in 3-6 fathoms. Uruguay, both destitute of apices and having the outer-lip broken away, are so distinct from any other species as to be worthy of mention.

Shell of good size, long and moderately slender, thick, opaque white, tinted with yellow at the sutures, with considerable lustre. The larger specimen has 10 flattened whorls, having a slight bulge just above the well marked suture. Transverse ribs about 20, ill-defined, not reaching quite to the lower suture, broadly rounded, straight, very oblique, gradually decreasing in prominence as the shell increases, so that on the body-whorl they show but faintly. Interspaces narrow and shallow. Base elongate, well-rounded, smooth. Aperture badly broken; inner-lip considerably thickened and reflected.

Length of the larger specimen, $7\frac{1}{2}$ mm.; diameter, $1\frac{4}{5}$ mm.; length of aperture, about $1\frac{1}{2}$ mm.

This species is more slender and more gradually tapered, with fewer and less distinct ribs than *T. Uruguayensis*, described and figured by Mr. Pilsbry, 1897.

References to the original descriptions of the species of Turbonilla belonging to this region.

1826. Say, Thomas.—Journal Academy Natural Sciences of Phila., v, p. 208. Descriptions of Marine Shells Recently Discovered on the Coast of the United States.

1844. Philippi.—Mollusca Sicily, ii, p. 137, Pl. XXIV.
- 1847 (?). d'Orbigny, Alcide.—Voyage dans l'Amérique Méridionale, pp. 397 and 496, Pls. LIII and LXXVI.
1850. Adams, C. B.—Contributions to Conchology, No. 5, pp. 72-75. Descriptions of Supposed New Species of Marine Shells which Inhabit Jamaica.
1853. d'Orbigny, Alcide.—Histoire de l'Ile de Cuba, i, pp. 218-227, atlas, Pls. XVI-XVII.
1860. Kurtz, J. D.—Catalogue of Recent Marine Shells found on the Coasts of North and South America, p. 8.
1862. Gould, A. A.—Proceedings Boston Society of Natural History, viii, p. 280. Descriptions of New Genera and Species of Shells.
1875. Mörch, O. A. L.—Mal. Blätt., xxii, pp. 159-169. Synopsis Molluscorum marinorum Indiarum occidentaliū.
1883. Dall, W. H.—Proceedings U. S. National Museum, vi, p. 332. On a Collection of Shells sent from Florida by Mr. Henry Hemphill.
1885. Watson, R. B.—Report Voyage Challenger, Zoölogy, Scaphopoda and Gasteropoda, xv, pp. 488-493, Pl. XXXII.
1889. Dall, W. H.—Bulletin Museum Comparative Zoölogy, xviii, pp. 335-337, Pl. XXVI.
1897. Pilsbry, H. A.—These Proceedings, p. 296, Pl. VI.

References to descriptions and figures of fossil species.

1860. Holmes, F. S.⁴—Post-pleiocene Fossils of South Carolina, pp. 82-83, Pl. XIII.
- 1887-1888. Meyer, Otto.⁵—On Invertebrates from the Eocene of Mississippi and Alabama, p. 51, Pl. III. On Miocene Invertebrates from Virginia, p. 141, fig. 2.
1896. Guppy, R. J. L., and Dall, W. H.—Tertiary Fossils from Antillean Region. Proceedings U. S. National Museum, xix, pp. 316-317, Pls. XXVII and XXVIII.

⁴ The species given on p. 83 as *Turbonilla nivea* Stimpson and figured on Plate XIII is a much stouter species and very different from the *T. nivea* St. (1851) of Verrill (not *Odostomia nivea* A. Adams, 1860) = *T. Holmesii* Bush.

The *T. interrupta* Totten may be a stout variety of the Northern species.

⁵ The fossil form described and figured as *T. paucistriata* Jeffreys, is a distinct species which may be designated as *T. Meyeri*.

List of the species arranged in two sections, as they have not or have spiral sculpture; subsections, as the ribs are absent or present on the base; and again divided by the character of the spirals.

1.—NO SPIRAL SCULPTURE.

A.—Transverse ribs ending at periphery of body-whorl; ribs clearly defined = *Turbonilla* restricted.—Type. *T. lactea* (Linné) = *T. elegantissima* (Montagu).

T. kymatoëssa Watson—whorls 6 + the oblique, flattened nucleus; ribs 14. L. $.12 \times$ w. $.038$ inch. Deep water.

T. modesta (d'Orbigny), 1853—not *O. modesta* Stimpson, 1851—wh. 7 with the transverse nucleus; ribs about 16. $2 \times \frac{1}{2}$ mm.

T. Heilprini Bush—wh. 8 + the slightly oblique, flattened nucleus; ribs about 18. $2\frac{1}{2} \times$ about $\frac{3}{8}$ mm.

T. compsa Bush—wh. 8 + (nucleus wanting); ribs about 36. $3\frac{2}{3} \times$ about 1 mm.

T. leuca Bush—wh. 9 + the transverse, very projecting nucleus; ribs about 24. $4\frac{1}{2} \times 1\frac{1}{3}$ mm.

T. inclinata Bush—wh. 9 + the transverse, very projecting nucleus; ribs about 20. $3\frac{1}{2} \times \frac{4}{5}$ mm.

T. abrupta Bush—wh. 9 + the transverse, projecting nucleus; ribs about 20. 4×1 mm.

T. rhabdota Watson—wh. 9 + the oblique, projecting nucleus; ribs 14. $.18 \times .04$ inches. Deep water.

T. curta Dall—wh. 9–10 + the oblique, projecting nucleus; ribs about 25. 8.3×2.9 mm. Deep water.

T. levis C. B. Adams, 1850—not *O. levis* Angas, 1867—wh. 9–10 + the very oblique nucleus; ribs 28–30. $.165 \times .04$ inches.

T. æqualis (Say)—wh. 10 with the transverse, projecting nucleus; ribs 20–22. $\frac{1}{3}$ inch or $4\frac{1}{2} \times 1\frac{1}{4}$ mm.

T. pusilla C. B. Adams, 1850—not *T. pusilla* Philippi, 1844, nor *O. pusilla* Jeffreys, 1869 and 1884—wh. 10–11 + the very oblique nucleus; ribs 12. $.135 \times .03$ inches. (= *T. minor* Bush).

T. Penistoni Bush—wh. 11 + the transverse, very projecting nucleus; ribs about 18. $4\frac{1}{2} \times 1$ mm.

T. pulchella (d'Orbigny), 1853—not *O. pulchella* A. Ad., 1861—wh. 12, with slightly, oddly tilted nucleus; ribs about 18. $7-8 \times 1\frac{1}{2}$ mm.

- T. Dalli* Bush—wh. 12 + the transverse, projecting nucleus; ribs 26. $8\frac{2}{3} \times 2\frac{1}{3}$ mm.
- T. Hemphilli* Bush—wh. 12 + the transverse, projecting nucleus; ribs 20. $9 + \times 2$ mm.
- T. Swiftii* Bush—wh. 13-17 + the oblique, projecting nucleus; ribs 20-26. $6-7 + \times 1$ mm.
- T. exarata* (Lea)—not *Menestho exarata* A. Ad., 1861—wh. 15 with nucleus; ribs about 22.
- B.—Transverse ribs not always reaching periphery of body-whorl; ribs ill-defined.
- T. atypha* Bush—wh. 10 + (nucleus wanting); ribs 20. $7\frac{1}{2} + \times 1\frac{4}{5}$ mm.
- T. Uruguayensis* Pilsbry—wh. 11 + the transverse, very projecting nucleus; ribs about 26. 10.3×3 mm.
- T. belothecca* Dall—wh. 15 + (nucleus wanting); ribs about 20. 14×3 mm. Deep water.

2.—SPIRALS PRESENT.

A.—Transverse ribs ending at periphery of body-whorl; base usually smooth; spirals = raised, rounded threads.

T. reticulata C. B. Adams—wh. 7 + the very oblique, flattened nucleus; ribs 26-30; threads coarse, distant, decussating the ribs. $.125 \times .04$ inches.

T. multicostata C. B. Adams—wh. 9 + the very oblique, flattened nucleus; ribs 34-38; threads coarse, distant, traversing the ribs on their lower portion. $.165 \times .045$ inches.

T. unilirata Bush—wh. 9 + the transverse, projecting nucleus; ribs 20-24; 1 thread just below suture. $3\frac{1}{2} \times$ about $\frac{4}{5}$ mm.

B.—Transverse ribs ending at periphery of body-whorl; base sculptured; spirals = incised lines; no spirals above.

T. turris d'Orbigny—wh. 14, with oblique, flattened nucleus; ribs about 22; intercostal spaces smooth; base spirally striated. $7 \times 1\frac{1}{3}$ mm.

B'.—Transverse ribs ending at periphery of body-whorl; base usually sculptured; spirals above.

a.—SPIRALS COARSE, EQUAL OR NEARLY SO = *Pyrgostelis* Monterosato, 1884. Type, *T. rufa* Philippi.

T. virga Dall—wh. 10 + (nucleus wanting); ribs about 20; spirals = 7 lines on intercostal spaces. $6 \times 1\frac{1}{2}$ mm.

- T. dispar* Pilsbry—wh. 8 + the transverse, flattened nucleus; ribs indistinct; spirals = about 5 lines. 8.2×2.3 mm.
T. incisa Bush—wh. 9 + the slightly oblique, flattened nucleus; ribs 20; spirals = 6 or 7 lines. $6\frac{2}{5} \times 1\frac{1}{5}$ mm.

b.—SPIRALS UNEQUAL, COARSE AND FINE.

- T. Rushii* Bush—wh. 12 + (nucleus wanting); ribs 24; spirals = 2 subequal grooves just above suture, 2 similar ones above middle, and finer lines. $9\frac{1}{2} \times 2\frac{1}{2}$ mm.
T. Conradi Bush—wh. 12 + the transverse, flattened nucleus; ribs about 22; spirals = 1 groove above suture, a band of 3 unequal ones on middle, and fine lines. $8\frac{1}{2} \times$ about 2 mm.
T. pyrrha Bush—wh. 10 + the slightly oblique nucleus; ribs 28–42; spirals variable = 1 sutural groove, sometimes a second above middle, and fine lines. About $6 \times 1\frac{1}{5}$ mm.
T. obeliscus C. B. Adams, 1850—not *T. obeliscus* Gould, 1861, nor *O. obeliscus* Garrett, 1871, nor Jeffreys—wh. 11 + (nucleus wanting); ribs 26–30; spirals = 1 broad line above middle, similar ones on middle and anterior of body-whorl, and crowded striae. $.25 \times .05$ inches.
T. punicea Dall—wh. 13, with transverse, flattened nucleus; ribs 18–22; spirals = 1 sutural and 1 median groove with several fine lines. 8×1.75 mm.
T. puncta C. B. Adams—wh. 10–11 + the oblique, nearly flattened nucleus; ribs 26–30; spirals = 1 sutural groove, 1 similar one above middle, and very fine, crowded lines. $.22 \times .05$ inch, or $6\frac{1}{5} \times 1\frac{1}{2}$ mm.
T. substriata C. B. Adams—wh. 8 + the oblique, nearly flattened nucleus; ribs 22–24; spirals = 1 inconspicuous, median groove, and exceedingly fine lines. $.115 \times .04$ inch.
T. subulata C. B. Adams, 1850—not Holmes, 1860, nor *O. subulata* Philippi, 1860—wh. 10 + the oblique nucleus; ribs 28–30; spirals = exceedingly fine crowded lines, one next below suture larger. $.17 \times .045$ inch.
T. suturalis Gould, 1862—not *O. suturalis* Philippi, 1844—wh. 7–8 with nucleus (?); ribs 10–12; spirals = very fine striae, 1 near suture more impressed. $3 + \times 1$ mm. Near preceding.
T. fulvocincta (Jeffreys) Dall—not Thompson—wh. 9 + the transverse, nearly flattened nucleus; spirals = 6 or 7 coarse lines and 6–12 fine ones. $5\frac{1}{2} \times 1\frac{3}{5}$ mm. (= *T. lineolata* Bush).

T. viridaria Dall—wh. 16, with blunt, sinistral nucleus; ribs about 25; spirals = 5 coarse and a few fine lines. 11×2.25 mm.

T. elegans Verrill, 1874 (?) variety (?)—not *Ch. elegans* d'Orb., 1853, nor *O. elegans* A. Ad., 1860, nor Monterosato, 1869—wh. 8 + nucleus wanting; ribs 22; spirals = 5 coarse and 2 fine lines. $6 \times 1\frac{1}{5}$ mm.

T. sp. (young)—wh. 6 + nucleus wanting; ribs about 24; spirals = 6 coarse and 2 fine lines. $3\frac{1}{2} \times 1\frac{1}{5}$ mm.

T. sp. (young)—wh. 6 + nucleus wanting; ribs about 20; spirals = 6 coarse and several fine lines. $4\frac{4}{5} \times 1\frac{1}{2}$ mm.

c.—SPIRALS FINE, EQUAL OR NEARLY SO.

T. exilis C. B. Adams, 1850—not *O. exilis* Garrett, 1873—wh. 10 + the transverse, nearly flattened nucleus; ribs 15–18; spirals numerous, not on base. $.165 \times .037$ inch.

C.—Transverse ribs reaching below periphery of body-whorl. Spirals = incised lines and raised, rounded threads.

T. textilis Kurtz (?)—wh. 6 + the oblique, flattened nucleus; ribs 20–26; spirals = wide, deep grooves on whorls, and raised, rounded threads on base. $3\frac{1}{5} \times 1\frac{1}{5}$ mm.

T. fasciata d'Orbigny, 1847 (?)—not Carpenter, 1857, nor *O. fasciata* Dunker, 1860, nor Tenison-Woods, 1875—wh. 9 + nucleus (?); ribs about 20; spirals = striæ on whorls and raised threads on base. $2\frac{4}{5} \times 1\frac{1}{5}$ mm.

D.—Transverse ribs extending over base. Peritreme not continuous.

T. flavocincta C. B. Adams—8–9 + the very oblique nucleus; ribs 28; spirals = exceedingly minute lines, coarser and traversing the ribs anteriorly. $.145 \times .04$ inch.

T. ornata d'Orbigny,⁶ 1853—not Gould, 1861—wh. 10, with tilted nucleus; ribs about 24; spirals fine on all intercostal spaces. 6×1 mm.

T. Stimpsoni Bush—wh. 9 + the slightly oblique, flattened nucleus; ribs about 36; spirals = several on all intercostal spaces. $5\frac{2}{3} \times 1$ mm.

D'.—Transverse ribs extending over base. Peritreme continuous.

⁶ d'Orbigny's types were presented to the British Museum.

a.—SPIRALS FINE, NEARLY UNIFORM.

- T. latior* C. B. Adams—wh. 9 + the nearly transverse, flattened nucleus; ribs 20–24; spirals = numerous, crowded, cutting into sides of ribs. $.215 \times .065$ inch.
- T. Riisei* Mörch, 1875—not Dall, 1889—wh. ? + nucleus ?; ribs about 40; spirals = fine striae on all intercostal spaces. $3\frac{1}{2} \times 1\frac{1}{3}$ mm.
- T. Pilsbryi* Bush—wh. 6 + the oblique, flattened nucleus; ribs about 26; spirals = exceedingly fine on all intercostal spaces. $4\frac{1}{2} \times 1\frac{1}{2}$ mm.

b.—SPIRALS INCISED AND RAISED.

- T. pupoides* d'Orbigny—wh. 7–8 + the nearly transverse, flattened nucleus; ribs 22–30; spirals = scarcely discernible lines on whorls and raised rounded threads on base. $3\frac{1}{2}$ –4 \times 1 mm.
- T. phrikalea* Watson—wh. 7, with tilted nucleus; ribs 25; spirals = raised rounded threads on base. $.13 \times .039$ inch. Deep water. Same as preceding.

c.—SPIRALS RAISED.

- T. asperula* Bush—wh. 6 + the oblique, flattened nucleus; ribs 26; spirals = raised, rounded threads on all intercostal spaces. 3 \times 1 mm.

List of other species of Chemnitzia which are not referable to the genus Turbonilla, with notes.

- Chemnitzia Americana* d'Orbigny, 1847 (?)—Generic relations doubtful. Original description not accessible; the figure, as reproduced by Tryon, strongly resembles some species of *Scala*.
- Chemnitzia Babylonica* C. B. Adams, 1846—Strongly carinated *Odostomia* (*Cingulina*).
- Chemnitzia cancellata* d'Orbigny, 1853—not *Dunkeria cancellata* Carpenter, 1857—Spirally granulose *Odostomia*.
- Chemnitzia dubia* d'Orbigny, 1853—not *Odostomia dubia* Jeffreys—Has not the nucleus of a *Turbonilla*. The figure given in atlas, *Ile de Cuba*, does not agree with the description. Can possibly be referred to the genus *Fenella*.
- Chemnitzia elegans* d'Orbigny, 1853—not *Turbonilla elegans* Verrill, 1872, nor *Odostomia elegans* A. Adams, 1860, nor Mon-

terosato, 1869—Relations doubtful. In its peculiar thickened base, it resembles *Cerithium turrita* Stearns.

Chemnitzia erythrosclera Mörch, 1875, and *Chemnitzia Krebsii* Mörch, 1875—Relations doubtful. Nuclei not described.

Chemnitzia levigata d'Orbigny, 1853—True *Odostomia*.

Chemnitzia simplex d'Orbigny, 1853—not *Odostomia simplex* Angas, 1871—*Eulimella*.

Chemnitzia spirata Kurtz and Stimpson, 1851—not *Odostomia spirata* A. Adams, 1860—Finely striated *Odostomia* (*Auriculina* or *Ondina*).

Chemnitzia turritella Pfr. (Mösch, 1875.)—Relations Doubtful.

EXPLANATION OF PLATE VIII.

The figures are camera-lucida drawings by Mr. A. H. Verrill.

- Fig. 1. *Turbonilla pyrrha* Bush, p. 160—Type (No. 72,050); 6 mm. long \times $1\frac{2}{3}$ mm. diameter.
- Fig. 2. *Turbonilla textilis* Kurtz (?), p. 154—Specimen (No. 72,051); 4 mm. \times $1\frac{1}{2}$ mm.
- Fig. 3. *Turbonilla Hemphilli* Bush, p. 169—Type (No. 79,013); $5\frac{1}{3}$ mm. \times $1\frac{1}{2}$ mm.
- Fig. 4. *Turbonilla abrupta* Bush, p. 168—Type (No. 79,012); 4 mm. \times 1 mm.
- Fig. 5. *Turbonilla pupoides* d'Orbigny, var. *ischna* Bush, p. 153—Type (No. 79,014); $3\frac{2}{3}$ mm. \times 1 mm.
- Fig. 6. *Turbonilla unilirata* Bush, p. 165—Type (No. 79,010); 3 mm. \times $\frac{4}{5}$ mm.
- Fig. 7. *Turbonilla Stimpsoni* Bush, p. 156—Type (No. 72,042); $5\frac{2}{3}$ \times about 1 mm.
- Fig. 8. *Turbonilla Dalli* Bush, p. 169—Type (No. 72,049); 8 mm. \times $2\frac{2}{3}$ mm.
- Fig. 9. *Turbonilla Pilsbryi* Bush, p. 151—Type (No. 72,095); $4\frac{1}{2}$ mm. \times $1\frac{3}{5}$ mm.
- Fig. 10. *Turbonilla Conradi* Bush, p. 159—Type (No. 72,052); $8\frac{3}{5}$ mm. \times 2 mm.
- Fig. 11. *Turbonilla Rushii* Bush, p. 160—Type (No. 70,535); $9\frac{1}{2}$ mm. \times $2\frac{2}{3}$ mm.
- Fig. 12. *Turbonilla incisa* Bush, p. 156—Type (No. 62,800); $6\frac{2}{3}$ mm. \times $1\frac{1}{2}$ mm.
- Fig. 13. *Turbonilla Heilprini* Bush, p. 167—Type (No. 79,009); $2\frac{1}{2}$ mm. \times mm.
- Fig. 14. *Turbonilla Penistoni*, Bush, p. 165—Type (No. 70,024); $4\frac{1}{2}$ mm. \times 1 mm.